ARTICLE 1

Understanding Mentoring Within an Ecosystem of Practices

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Abstract: The aim of this article is to introduce an ecosystemic approach to mentoring, inspired by the theory of *ecologies of practices* (Kemmis, Edwards-Groves, Wilkinson, & Hardy, 2012). It is suggested that relationships between practices and their environment resemble in many ways the relationships between natural organisms and ecosystems. From this perspective, mentoring is understood as a social practice that exists in the midst of other social practices and derives its essential qualities and its existence from its relation to other practices. The theory of ecologies of practices is based on the conception of practices as 'living entities'. From the perspective of ecologies of practice, practices of mentoring and induction can be regarded as ecosystems of their own within the wider ecosystems of social, political and educational practices. In the research literature, the concept of ecosystem has been represented in a number of different variations. The concept was first introduced in education research by the developmental psychologist Urie Bronfenbrenner (1979), who described human development and socialisation in terms of nested circles of varying sizes. Lately, the ecosystem concept has also been used in the context of learning in ways that have been influenced by research in the fields of economics, business and information technology. The theory of ecologies of practices is rooted in an ontological understanding of the importance of learning for human existence: the human species exists as part of the natural ecosystem and, consequently, social practices are based on how the species acts to survive and thrive in the ecosystem. Based on these assumptions, ten ecological principles are introduced and applied to practices of mentoring: (1) networks, (2) nested systems, (3) niches, (4) interdependence, (5) diversity, (6) cycles, (7) flows, (8) development, (9) dynamic balance, and (10) resilience. Finally, some limitations and criticisms of the ecosystem approach are reflected upon.

Keywords: mentoring, induction, ecologies of practices, practice theory, ecosystems of learning

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Introduction: Mentoring as a 'living thing'

The unifying goal of this book is to explore the practices of mentoring newly qualified teachers in the Nordic countries and Estonia. Mentoring practices are introduced by presenting the special characteristics and historical developments of mentoring in these particular educational and political settings. Mentoring is understood as a special kind of *social practice* that exists in the midst of other social practices.

We can view the relationships between different practices and the environments in which they exist as closely analogous to organisms and their relationships within the natural environment. These relationships are the subject of *ecological research*. In order to apply the conceptual tools derived from ecology, we need to look upon mentoring as a kind of 'living thing', or, at least, very much like a living thing (Kemmis et al., 2012). Social practices resemble living organisms in many ways. Practices, like living organisms, evolve, live and die in a particular setting. They can move from one place to another, form territories and compete with one another. Some of these living entities are more sustainable or more resilient than others and occupy larger territories than others. Practices also develop the qualities they need to survive in the struggle for survival. Some gradually evolve into increasingly powerful forms. Others lose the evolutionary struggle, disappear and die out. Similar to organisms competing for their place within natural ecosystems, natural selection and evolution also seem to take place among human practices.

The whole set of social practices in the midst of which mentoring lives can be understood as an *ecosystem of education*. We can consider mentoring as a particular species, or an ecosystem of its own, that lives and exists within a wider ecosystem of social, political and educational practices. This ecosystemic view has been represented in a number of different variations in the recent literature and conceptualised slightly differently in terms of *ecologies of practice* (Kemmis et al., 2012), *ecosystems of schools* (Godfrey & Brown, 2019), *ecosystems of innovation* or *ecosystems of learning* (Virolainen, Heikkinen, Siklander, & Laitinen-Väänänen, 2019), *ecologies of learning* (Barnett & Jackson, 2020) or *learning ecologies* (Savin-Baden, 2020).

The aim of this article is to introduce and elaborate a theoretical perspective on mentoring as an ecosystem. Particular attention will be paid to

the theory of *ecologies of practices* and the ecological principles developed on the basis thereof. In addition to the principles previously presented in the literature (Capra, 2004, 2005; Kemmis & Heikkinen, 2012; Kemmis & Mutton, 2012), one new principle is introduced, namely the *principle of resilience*. Some of these ecological principles are applied in other articles of this book. Finally, some limitations and criticisms regarding the application of the ecosystemic approach are introduced.

A short genealogy of ecologies of mentoring

In order to better understand the potentials and limitations of the concept of ecosystem in educational research, we must first take an excursion to the historical background, or genealogical roots, of the concept. In historical terms, the concept of *ecology* was first coined by the German zoologist Ernst Haeckel, who is also known as the founder of the discipline. Haeckel's research was inspired by Charles Darwin's *On the Origin of Species* (1859/2009). Haeckel came up with the concept of ecology by combining two Greek words, *oikos* and *logos*. Depending on the context, *oikos* may mean a heart, a fireplace, a home or home-economy. Metaphorically, it refers to the most important, relevant, or active point of a thing or place, such as the heart or centre of a city or village. Such a place may also be called a *nucleus*, familiar to us from physics and biology; the central and most important part of an entity, forming the basis for its existence and activity. The meaning of the word *logos*, in turn, has been the subject of long philosophical debate, but in its simplest sense it means a word, a speech, a talk or a lesson. The etymological background of the concept of ecology thus refers to speaking, lecturing or understanding (*logos*) about the relationship between the place of interest, or nucleus (*oikos*), and its surroundings. Ecology, in short, is the study of the relationship between organisms and the environment; it focuses on the interaction between living entities and their surroundings and the conditions of existence of species and the larger entities formed by them (Wals, 2020; Virolainen et al., 2019).

Subsequently, the combination of systemic thinking and ecology gave rise to the concept of *ecosystem*, as first introduced by the British botanist

Arthur Tansley in 1935 (Willis, 1997). System theory is not, however, a necessary element of ecological research, and some scholars have claimed that system theory assumptions are ontologically problematic when considering nature, and that such assumptions can even prevent understanding of ecological phenomena as they are (Virolainen et al., 2019).

The concept of ecosystem was first introduced in education research by the developmental psychologist Urie Bronfenbrenner (1979), who described human development and socialisation through a model of nested circles of varying sizes. The circles defined by Bronfenbrenner characterise interactions between individuals (microsystems), interconnections between environments (mesosystems), interconnections and processes of the evolving human individual (exosystems), and, more broadly, cultural values, habits and norms in societies. Later, Bronfenbrenner introduced the concept of a chronological system to describe temporal change. Bronfenbrenner's theory has recently been systematically applied to the study of learning ecosystems (e.g. Godfrey & Brown, 2019).

However, lately, the ecosystem concept has been used in educational research in ways that are influenced by economics and information technology. For example, in the EU there has been much discussion about *innovation-driven* or *university-based entrepreneurship ecosystems* (e.g. Fetters, Greene, Rice, & Butler, 2010; Groth, Esposito, & Tse, 2015). The concept of ecosystem is widely used to refer to business-to-business networks. One of the pioneers in applying an ecosystemic approach to business research was James F. Moore, whose article 'Predators and Prey' (1993) laid the foundation for understanding business through the ecosystem analogy by introducing the concept of *business ecosystems*. According to Moore, business competitors can be metaphorically seen as predators chasing prey. Businesses struggle for survival in a particular market niche, just like animals and plants compete for space in an ecological niche.

From the point of view of the business ecosystem, education can be seen as a subsystem of the economic system, generating a skilled workforce and potential consumers. From this perspective, education is subordinate to the economy. As a result, it is most productive to invest in so-called *human capital* (Peters & Bulut, 2011). Human cognitive skills are thus reduced to a means of production. This approach has been conceptualised as the

knowledge economy (Powell & Snellman, 2004), *knowledge capitalism* (Burton-Jones, 2003) and *cognitive capitalism* (Boutang, 2003; Heikkinen, 2018; Peters & Bulut, 2011).

There seem to be many different ways of applying the concept of ecosystem to educational practices. A genealogical analysis of the concept (Virolainen et al., 2019) reveals that ecosystem refers to a wide range of phenomena in multiple contexts, to the extent, even, that the use of the term verges on eclecticism. Despite the wide use of multiple terms rooted in the concepts of ecology or ecosystem, the concept has not been adequately defined in the educational field.

The impact of economics seems therefore to be significant in how the concept of ecosystem has come to be understood in education, which generally reflects an economic imperative and a neoliberal perspective. Through the concept of ecosystem, new models of organising collaboration between businesses and educational institutions are being developed in the intermediate space between (higher) education and the world of work. These ecosystems are often enabled by digitalisation; the 'new ecosystems of learning' are often *digital* ecosystems.

However, one would expect the field of education to also reflect on how the ecosystem concept relates to the ecological challenges of our time. It is somewhat confusing to see that, despite our increasing awareness of the threat of an eco-crisis, the 'new ecosystems of learning' talk rarely addresses the very real environmental challenges that we face or the ontological importance of learning for human beings. The decisive factor in the evolutionary success of humans has been the development of a big brain and the capacity to learn new things to survive. Yet, the current discussion rarely mentions how vital it is for humans to learn to avoid ecological disaster – even when the very existence of our species in the global ecosystem depends on our ability to learn.

Understanding mentoring through ecological principles

The view of mentoring as an ecosystem of practices introduced in this article is based on the theory of *ecologies of practices*. In this theoretical

approach, ecology is taken in its true ontological sense: the human species exists as part of the natural ecosystem and, consequently, human social practices are based on how the species acts to survive and thrive in the ecosystem. Ontologically speaking, humans form a living system that exists within a larger living system. Capra crystallises this ontological view in the following way:

> First, *every living organism*, from the smallest bacterium to all the varieties of plants and animals, including humans, is a living system. Second, *the parts of living systems* are themselves living systems. A leaf is a living system. A muscle is a living system. Every cell in our bodies is a living system. Third, *communities of organisms*, including both ecosystems and human social systems such as families, schools and other human communities, are living systems. (Capra, 2005, p. 19)

On this basis, it is clear that human social practices are ontologically intertwined with the other living systems of the global ecosystem. It is also reasonable to assume that human practices form their own level within the natural ecosystem. Therefore, social practices can be supposed, subject to certain reservations, to function in a similar way to species in nature. Practices exist in ecological relationships with one another and in a whole ecosystem of interrelated practices. The theory of ecologies of practices explores whether and (if so) how practices are ecologically connected with one another. We are accustomed to thinking about relationships between practices in terms of the relationships between the *practitioners* who relate to one another, but we are less familiar with thinking about ecological relationships between *practices themselves*, which is the main focus in ecologies of practices (Kemmis et al., 2012; Kemmis & Heikkinen, 2012; Kemmis & Mutton, 2012).

Assuming practices live and interact with each other, much like an ecosystem, it is possible to study the relationships between them by applying ecological principles. These principles of ecology were first introduced by Fritjof Capra (2004, 2005) and further developed and applied to practices of mentoring (Kemmis & Heikkinen, 2012). Capra originally introduced eight ecological principles and, following Capra's specifications, Kemmis and Heikkinen (2012) introduced another: the principle of *ecological niches*. In this book, one more principle is suggested, that of *ecological resilience*.

Through these ten principles, the intention is to show how (a) mentoring practices, by analogy with species, and (b) ecologies of mentoring practices, by analogy with ecosystems, meet the criteria implied by these ten principles.

Table 1. Ecological Principles (Capra, 2004, 2005; Kemmis et al., 2012; Kemmis & Heikkinen, 2012; Kemmis & Mutton, 2012).

Ecological principles	If practices are living things and ecologies of practices are living systems, then ...	If mentoring is a special practice within the educational, social and political ecosystem, then ...
1. Networks	Practices derive their essential properties and their existence from their relationships with other practices.	Mentoring practices derive their essential properties from local, regional, national and international educational and political practices.
2. Nested systems	Different levels and networks of practice are nested within one another.	Mentoring practices are nested within other educational practices.
3. Niches	To survive in an ecosystem, the species (the particular social practice) must find an ecological niche that provides optimal living conditions for that particular species.	Mentoring practices inhabit a given ecological niche that exists within certain political and social conditions in society.
4. Interdependence	Practices within a given ecology of practices are dependent on one another, as are different ecologies of practices.	How mentoring can be organised depends on how other educational practices exist and function within that ecosystem.
5. Diversity	An ecology of practices includes many different practices with overlapping ecological functions that can partially replace one another.	There are different practices in the educational ecosystem that can partially replace one another, such as mentoring, tutoring, coaching, supervision, guidance and counselling.
6. Cycles	Some (particular) kinds of matter (or in education – practice architectures, activities, orders or arrangements) cycle through practices or ecologies of practices – for example, as in a food chain.	When new mentoring practices emerge, they are composed of elements or features of previous educational practices that are being circulated in a new kind of composition, e.g. peer-group mentoring evolved from traditional mentoring.
7. Flows	Energy flows through an ecology of practices and the practices within it, being transformed from one kind of energy to another (in the way that solar energy is converted into chemical energy by photosynthesis) and eventually being dissipated.	Physical energy flows through the 'doings', semantic energy flows through the 'sayings', and social energy flows through the 'relating' of the people involved in the mentoring practices.

(*Continued*)

Table 1. (*Continued*)

8. Development	Practices and ecologies of practices develop through stages.	Different stages of development can be seen in the development of mentoring practices.
9. Dynamic balance	Ecologies of practices regulate themselves through processes of self-organisation, and (up to breaking point) maintain their continuity in relation to internal and outside pressures.	The amount of importance given to mentoring in society varies; sometimes it is higher on the political agenda, sometimes lower.
10. Resilience	To a greater or lesser degree, practices resist interference from the outside, and maintain their balance without changing their self-organised processes and structures.	Mentoring practices withstand disturbances in their political, social and economic environment.

Next, these ecological principles will be applied more closely to the ecosystems of mentoring.

Networks

> Different practices derive their essential properties and their existence from their relationships with other practices.

The practices of mentoring are developed in networks of other educational and political practices (Bjerkholt & Hedegaard, 2008). Mentoring derives its essential properties and its existence from its relation with other practices, such as the education practices that inform and influence the social practices of a society or state which, in turn, inform and influence the conduct and content of education. The networks in schools, teacher education and continuous professional development are more often informal and based on self-organisation. While some of these networks are explicit and formalised, most are not well-defined and are tacit and implicit in nature. For example, this book is the result of the work of an explicitly and formally-established network. However, the network can also be characterised by its informal and implicit features. Initially, the Nordic Network for Mentoring was developed on the basis of informal communication between researchers, and it was formalised through formal projects funded by, for example, the

EU, NordPlus and national ministries of education. Sometimes the degree of formality has been higher and sometimes lower (Kemmis & Heikkinen, 2012).

Nested systems

Different levels and networks of practice are nested within one another.

The complex of practices that constitute the different national practices of mentoring appear to be 'nested' in other practices and, in this way, to be ecologically related. The idea of nested systems was implied already in the ecological system theory introduced by Bronfenbrenner (Bronfenbrenner, 1979; Godfrey & Brown, 2019). The practices of teacher induction are constituted in a complex system of education, initial and continuing teacher education, educational policy and administration, and educational research and evaluation in which different systems are nested within one another. The practices of mentoring and teacher induction, for example, are nested in the practices of teacher education and continuing professional development of teachers, which are nested in the general practices of education which, in turn, are nested in national practices that are functionally, politically and economically determined. The chain does not operate in a one-way direction, however. Together, these practices can be said to form an ecology within which the different practices are nested. Each of these practices shapes and influences the other practices that are 'external' to it, and those external practices, in turn, shape and influence the practices that are internal or subsidiary to them (Kemmis et al., 2012). A simplified illustration of this 'nestedness' is visualised in Figure 2 below.

Niches

To survive in an ecosystem, the species (the particular social practice) must find an ecological niche that provides optimal living conditions for that particular species.

In ecology, 'niche' refers to the distribution of resources and competitors necessary for the survival of an organism. The concept of 'niche' is close

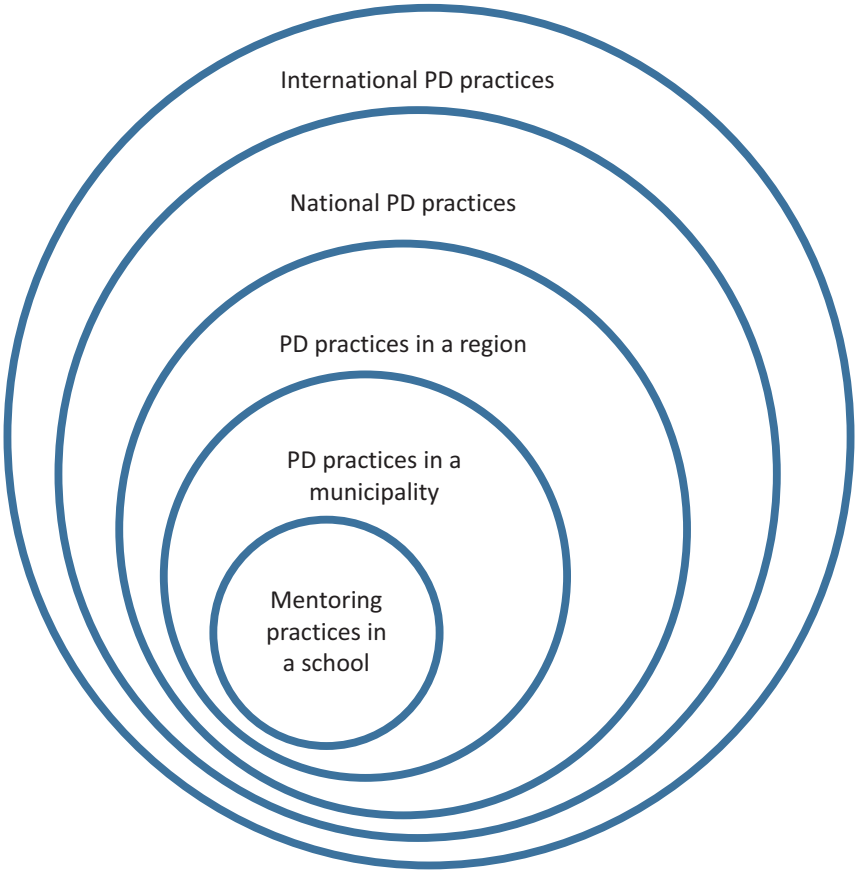

Figure 2. Nestedness of mentoring practices within the municipal, regional, national and international practices of professional development (PD).

to the previous idea of 'nestedness', but emphasises instead the particular substantive content of an environment that provides an organism – or a practice – with the conditions it needs to survive. According to Smith (1999), drawing upon the ideas of Gibson (1986), an ecological niche is

> that into which an animal *fits* … The niche is that in relation to which the animal is habituated in its behaviour (Gibson, 1986, p. 129). It embraces not only things of different sorts, but also shapes, textures, boundaries (surfaces, edges), all of which are organized in such a way as to enjoy affordance-character for the animal in question in the sense that they are relevant to its survival. The given features motivate the organism; they are such as to

> intrude upon its life, to stimulate the organism in a range of different ways. (Smith, 1999, p. 126)

Similarly, a niche stimulates a practice, providing it with motivations (points of departure), purposes (ends) and the characteristic places and paths in and through which it is enacted. The concept is used not only in ecology but also in business and economy. A *'niche market'* is a subset of the market that a specific product seeks to colonise; therefore, the niche defines the specific product features that are needed to satisfy its specific market needs. In both contexts, the entity (an organism or a product) finds its ideal living space in relation to other entities in given conditions and circumstances. Without its niche, a practice cannot be enacted and it cannot survive. On the other hand, a suitable niche can exist and then be colonised by a practice. This relationship is complex, however, because many aspects of niches of practices do not occur in the absence of human agency but as a result of it – as languages and discourses are made and developed by linguistic communities, for example. In this sense, practices appear to build the niches that support them. Thus, both niche and practice develop and evolve in interaction with one another (Kemmis & Heikkinen, 2012).

Interdependence

Different practices (understood as different species of practices, manifested in particular individual instances of that practice) are dependent on one another in ecologies of practices (understood as ecosystems) and can be sustained only in interaction with these other practices.

It is easy to imagine how different species in nature are dependent on each other, like bees are dependent on flowers. It is more challenging to understand how whole ecosystems are interdependent, like a coastal rainforest may be dependent on an alpine ecology above it, and vice versa. Some ecosystems are sustained only by their connections with these other ecologies. The same applies to ecologies of practices: to survive and flourish, practices are dependent upon their relationships with other ecologies.

All educational practices, like mentoring and induction, are dependent upon one another and dependent upon their relationships with the processes and practices of the wider society in which they exist. Some

of these practices are even *symbiotic*. In Europe, specific national educational practices may also be more or less interdependent with practices in other countries, such as international practices of research collaboration and their administration nationally. At the international level, a clear indication of the interdependence of the practices of teacher induction is that the European Union and the OECD have released a number of political outlines for teacher education and teacher induction (European Commission, 2001, 2007 and 2010; OECD, 2005). Typically, funding instruments are targeted at international projects, making the interconnectedness between mentoring practices even stronger (Kemmis et al., 2012; Kemmis & Heikkinen, 2012).

Diversity

> An ecology of practices includes many different practices with partially-overlapping ecological functions that can partially replace one another.

In teacher induction, many practices seem to co-exist and overlap with one another. There are also informal and spontaneous ways to support new teachers in creating diversity. Many schools employ special local practices through which new teachers are supported. Some of these activities can substitute, or replace, others as needs and circumstances require. These arrangements diversify according to the size of the school or municipality or, for example, geographical and population structures. In capital regions, for example, practical arrangements look quite different from those in more remote northern parts of the Nordic region.

At the international level, we can find a lot of diversity in the practices of teacher education and induction. In many countries, induction practices are more or less based on classical one-to-one mentoring. Sometimes the term '*tutoring*' is even used synonymously with mentoring. In the school context, tutoring often refers to older students, i.e. tutors, acting as advisers, guides and 'databanks' for younger students or pupils. Tutoring activities have been actively developed in various educational institutions and, for example, most universities provide yearly tutor training for students to be able to support new students. Tutoring is sometimes also

provided by teachers: at the initial stage, student groups are guided by one of the school's teachers. In this, the main difference between tutoring and mentoring is the context: tutoring is often used in an educational context while mentoring often occurs in working life. In other words, tutoring is associated with formal education, while mentoring is a form of non-formal training and guidance implemented in the workplace. As the forms of non-formal and formal education overlap, it is natural that the interpretations of mentoring and tutoring also overlap to some extent (Heikkinen, Jokinen, & Tynjälä, 2012; Kemmis & Heikkinen, 2012).

Sometimes, however, the term 'tutor' is used in the context of working life, for example in the UK where the term *induction tutor* has been introduced. The induction tutor is a more experienced teacher who has day-to-day responsibility for monitoring, supporting and assessing a newly qualified teacher. Induction tutors are expected to provide guidance and support, and make judgments on the performance of the new teacher through formative assessment activities that include observations and meetings to review progress at least every half-term. The induction tutor is expected to provide formative assessment and often be involved in the formal, summative assessment at the end of induction (Heikkinen et al., 2012; Kemmis & Heikkinen, 2012).

Coaching has been adopted into working life as a staff training method. Its meaning is fairly broad and vague, and its relation to the concepts of mentoring and on-the-job instruction is interpreted in a variety of ways. It is common for training enterprises to offer coaching and mentoring simultaneously. Educational services are marketed under the concept of coaching also with such names as *change coaching, solution-based coaching*, *life coaching* and *brain-based coaching.* The concept of coaching has also been linked to mentoring outside of business-world staff training. In the context of teacher education, the term 'coaching' is often used synonymously with mentoring. Mentoring in these contexts is associated with supervision and control, whereas coaching provokes a mental image of support provided to students in a way that respects their autonomy in order for them to achieve the goals they have set for themselves. This interpretation, nevertheless, has not been broadly used within the international teacher education debate (Kemmis & Heikkinen, 2012).

Another example of the diversity of practices is the Norwegian practice of '*veiledning*', related to that of mentoring although there seems to be no national consensus among Norwegians on the precise meaning of this concept (Olsen, 2011, p. 16). There are also some advocates of mentoring in Norway, and this conceptualisation seems to be associated with a certain group of educationalists who highlight certain differences in how things are done within the practice of mentoring. Thus, diversity exists not only in concepts, but also in the actions and arrangements and the collective identity of researchers and teacher educators. In the latter example, the collective identity of advocates of mentoring is achieved through a sense of otherness in contrast to those associated with *veiledning*.

Cycles

Matter cycles through practices.

From this perspective, we can observe that different kinds of matter cycle through practices like nutrients in a food chain. Although the food chain concept can be portrayed as linear, it is more accurately understood as a cycle in which the predators at the top of the chain die and are eaten by creatures further down. Specific practices cycle through history in the form of practice traditions that vary across time and space. For example, a child becomes a student who practises learning from a teacher who practises teaching, and goes on to become a teacher teaching students in the rising generations that follow. In turn, a new teacher enters the practice traditions of the school and the national educational culture. Some of these practice traditions seem to carry features of the initiation rites of ancient tribes; the newcomer has to meet with pain and public humiliation so as to achieve the status of an adult and full member of the tribe. In military service, for example, there is a long tradition of humiliation of newcomers, and we may easily find sad examples of those practices also within the school tradition being reproduced by new generations.

These practice traditions are not, however, reproduced without variation or difference; they are also constantly being transformed in the light

of changing historical, social and local conditions. Thus, ideas that first emerged centuries or millennia ago still circulate today with changed nuances or more elaborate meanings – or even come to mean something very different to what they once meant. And the same holds true for different kinds of activities and different kinds of relationships between people in different roles. For example, the relationships between more-experienced teachers and new teachers and students are reproduced and transformed cyclically. When a new practice emerges, it is composed of elements or features of previous practices that are then recirculated as part of the new composition (Kemmis & Heikkinen, 2012).

The circulation of practices is evident, too, in the various national practices supporting new teachers. They circulate each other's practices and the practices of local traditions. The Norwegian *veiledning* is, again, a good example. It fruitfully circulates many of the practices common to many of the pre-service teacher education programmes in the Western world. The circulation of practices therefore takes place in many ways and at many levels and – as in the natural world – the 'food chains' involved vary in length.

Flows

> Energy flows through ecologies of practices and the practices within them, being transformed from one kind of energy to another (in the way that solar energy is converted into chemical energy by photosynthesis) and eventually being dissipated.

In ecology, physical energy is transformed from one form to another as it flows through biological systems. In the human and social world, we can draw an analogy with the different kinds of energy transferred and expended when people carry out various practices. Like other biological organisms, the participants need *physical energy*. That is, physical energy flows through practices as it does through the 'doing' of the people involved in a practice. However, there are also different forms of energy that flow through practices: what we might call *semantic energy* that flows through practitioners' 'sayings' in a practice, and *social energy* that flows through practitioners' 'relating' in a practice. In each of these

additional dimensions there is a flow of energy analogous to the flow of physical energy through the biological entities participating in practices (Kemmis et al., 2012; Kemmis & Heikkinen, 2012).

Development

Practices and ecologies of practices develop through stages.

The practices of teacher induction have evolved from mentoring practices over a very long time. The origin of the concept of mentoring is based on Homer's (between 8th and 6th century BCE) epic poem *The Odyssey* about Odysseus, King of Ithaca. In this ancient tale, Odysseus asks his friend Mentor to watch over his son Telemachus while he fights the Trojan War. The first recorded modern usage of the term has been traced to another book 'Les Aventures de Télémaque', written by Francois Fénelon in 1699 in France. This has been regarded as the source of the modern use of the word 'mentor' to mean a trusted friend, counsellor or teacher, usually a more-experienced person. In traditional one-to-one mentoring, newcomers are paired with a more-experienced person who advises them and serves as a role model. Today, mentors often provide expertise to less-experienced individuals to help them advance in their career, enhance their education, and build networks. In education, this type of mentoring still seems to be the most commonly practiced internationally. Newer forms of mentoring, such as the Finnish peer-group mentoring (PGM) model, have, however, emerged in recent years, indicating that the practice of mentoring does seem to be evolving.

Likewise, mentoring as a part of the induction arrangements for new teachers is developing within wider ecologies of practices. Where teacher education is regarded as the formation of each individual teacher, and where induction is seen as the responsibility of the employer to each individual employee, then more individualist forms of mentoring are likely to be found and individualist perspectives will pervade throughout the ecology of practices. Similarly, where more communitarian practices are pursued, more collectivist ecologies of practices will emerge (Heikkinen et al., 2012; Kemmis et al., 2012; Kemmis & Heikkinen, 2012).

Dynamic balance

> Ecologies of practices regulate themselves through processes of self-organisation, and maintain (up to breaking point) their continuity in relation to internal and outside pressures.

Living systems are not static; they are in a dynamic balance. This is contrary to the kind of balance reached when equal opposing forces meet, when things are in stasis, and action stops. Living systems are characterised by constant change, as are practices in the day-to-day life of a school or a classroom. But keeping things in balance is possible only within limits. Living systems continually bring themselves back into balance when they encounter crisis points, resistance, critical incidents, confusion, instability, lack of flexibility and disturbance.

In the case of teacher induction practices, many national education practices have reached a crisis point or a critical stage as the number of teacher retirements and resignations has increased. To address this crisis in the teaching workforce, governments are having to find new balance within and between different ways of conceptualising the process of beginning teaching: the material-economic resources allocated to teacher education and induction; and the ways of connecting the students and teachers involved in pre-service teacher education, teachers in schools, new teachers coming to schools, and the people assisting them in making their transition to school work and to the school as a workplace. In doing so, they are engaging in developing a variety of individual practices that contribute to the ecology of practices, and thus assisting the development of the ecology as a whole (Heikkinen et al., 2012; Kemmis et al., 2012; Kemmis & Heikkinen, 2012).

Resilience

> To a greater or lesser degree, practices resist interference from the outside, and maintain their balance without changing their self-organised processes and structures.

The concept of resilience, originally derived from physics, has been utilised in many fields, such as ecology and psychology. Generally speaking,

resilience refers to the capacity to rebound, to 'bounce back'. In positive psychology, it means an ability to resist or recover from adversity, uncertainty, conflict or failure. It can also be defined as 'the ability of an individual, team, or school to adapt to changing demands, to recover, and to remain vigorous after the changes have occurred' (Kunnari, 2018, p. 112).

The principle of resilience is closely related to the above-mentioned ecological principles and, especially, to the concepts of interdependence and dynamic balance. Practices sometimes come into conflict with each other – this indicates that these practices are interdependent of each other, i.e. out of balance with each other, in the ecosystem. If the dynamic balance of a given practice is disturbed to tipping point, the practice can either lose its state of stability and collapse or die, or, alternatively, transform to another stable state. Resilience means resistance to critical incidents, confusion and instability. Resilient practices are flexible and can sustain disturbances in their political, social and economic environment and thus maintain their balance without changing their self-organised processes and structures.

Conclusions: possibilities and limitations of the ecological view

Many of the ecological principles that we have introduced above are explored in a variety of fruitful ways in the forthcoming articles of this book. As we delve deeper into these, it is good to be aware of the limitations of the analogy between social practices and ecosystems. We can easily agree with Capra about the ontological foundations and the ecological layers or levels of practices. It sounds plausible to suggest that if every living organism is a living system, also communities of organisms, including social systems, are living systems (Capra, 2005, p. 19). However, there are also some ontological differences. *Homo sapiens* is, in many unique respects, very different from other species, and we must be careful not to over-simplify social action; our species is also developing qualities that might earn us the title of *Homo Deus*, the divine man (Harari, 2016). Anthony Giddens (1979) also points out the ontological differences between natural systems and human social systems in terms

of reflexivity: human social systems are *reflexive systems,* capable of self-organisation through human reason and communication, whereas other natural systems operate merely through homeostatic causal loops (*mechanical systems*) or organic self-regulation (*autopoietic systems*).

The theory of ecologies of practices helps us understand the practices of mentoring to a point, but it does not quite illuminate all of the features of mentoring. Perhaps it would be wise to suggest that all theories have both their limitations and their opportunities. As Ludwig Wittgenstein (1922/2015) suggested, theories can be used as ladders to climb to new levels of understanding. But as soon as we achieve that new understanding and aspire to reach an even higher level, we can no longer use the same ladder; we have to throw it away, and find a new one.

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